IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of	Group Art Unit: 1743
Nathan S. Lewis *et al.*	Examiner: Arlen Soderquist
Application No.: 09/409,644	Appeal No.: 1
Filed: October 1, 1999	Certificate of Mailing
For: CONDUCTIVE ORGANIC SENSORS, ARRAYS AND METHODS OF USE	I hereby certify that this correspondence is being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 C.F.R. §1.10, Express Mail Label No. EV 793 689 828 US, on September 22, 2005 as is addressed to the Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450. By: K A Cabello Kim A. Cabello

REPLY BRIEF

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Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

This Reply Brief is in response to the Examiner's Answer mailed July 22, 2005. No fee is believed to be due for consideration of this Reply Brief. However, the Commissioner is hereby authorized to charge any appropriate fees under 37 C.F.R. §§1.16, 1.17, and 1.21 that may be required by this paper, and to credit any overpayment, to Deposit Account No. 02-4800.

(1) Real Parties in Interest

The Real Parties in Interest are as set forth previously and agreed to by the Examiner.

(2) Related Appeals and Interferences

There are no known related appeals or interferences.

(3) Status of Claims

The status of the claims is as set forth previously and agreed to by the Examiner.

(4) Status of Amendments

The status of amendments is as set forth previously and agreed to by the Examiner.

(5) Summary Claimed Subject Matter

The summary of claimed subject matter is as set forth previously in the Appeal Brief filed November 5, 2004, and agreed to by the Examiner.

(6) Grounds of Rejection to be Reviewed on Appeal

The grounds of rejection are as set forth in the first Appeal Brief filed November 5, 2004.

A. 35 U.S.C. §112, Second Paragraph Rejection

Appellants note that the 35 U.S.C. §112, Second Paragraph rejection raised in the non-final Office Action mailed January 25, 2005 has been withdrawn.

B. Non-Statutory Double Patenting Rejection

Appellants oppose the addition of a new ground of rejection (Obviousness-type Double Patenting) in the Examiner's Answer Brief mailed July 22, 2005. Appellants respectfully submit that the addition of a new ground of rejection in the Examiner's Answer is against the rules as set forth in 37 C.F.R. §1.193(a)(2) (see also MPEP §1208.1). Appellants have not had a fair opportunity to address the new ground of rejection during regular prosecution. Furthermore, the standard applied by the Examiner is that of infringement (*e.g.*, "Thus, one could not practice the patented claims without infringing the instant claims." (page 19, line 5 of the Examiner's Answer)). Infringement is not the standard for obviousness-type double patenting. Accordingly, Appellants respectfully request withdrawal of the new grounds of rejection.

7. Arguments

The references can be divided into two general categories, *i.e.*, conductimetric and amperometric-electrochemical sensors. Conductimetric sensors are taught in Gibson *et al.* and electrochemical sensors are taught in Casella, Thackeray, Yamato, Naarman, Li, Sakaguchi, Stetter or Wampler, as previously described (see, *e.g.*, Appellants Brief, April 25, 2005). Barisci describes both systems having independent properties, measurement capabilities and processes.

In electrochemical sensor systems (including potentiometric and amperometric), the sensor signal or current, "I", deriving from the electrooxidation at an electrode in an electochemical sensor is proportional to, for example, the partial pressure of the analyte to be measured at constant potential "U". For two electrode sensors (as depicted in Barisci at Figure 2(a) and in the Examiner's Answer at page 8), there is a constant potential between the sensing and auxiliary electrode. In a three electrode system a potentiostat keeps the potential constant between working and counter electrode. The three electrode configuration (shown in Barisci at Figure 2(b) and in the Examiner's Answer at page 8) allows for precise operation and measurement of ion-electron flow.

A three electrode electrochemical (e.g., amperometric) sensor system consists of five major parts: an electrolyte, a sensing or working electrode (W), a counter or reference electrode (R), an auxillary electrode (A) and a potentiostat (see, *e.g.*, Figure 2(b) of Barisci and the Figure 2(b) at page 8 of the Examiner's Answer). Each part of the sensor influences the overall performance and analytical characteristic of the sensor. The analyte gas may pass through a filter prior to entering the system which removes unwanted substances or alters the analyte ionic species. The electrolyte is often a concentrated aqueous solution sufficient for maintaining ionic species. The working, or sensing, electrode is typically a noble metal with a layer of conductive polymer (with or without a catalyst). The two remaining electrodes, the auxillary and reference electrodes, are located within the body of the system in the bulk of the electrolyte solution. The reference electrode is used to maintain the working, or sensing, electrode at a known electrochemical potential, is preferably not exposed to the analyte ionic species and must be stable in the electrolyte. The auxillary electrode completes the electrochemical cell by performing the half cell reaction, the nature of which is in opposition to the sensing

electrode reaction. The measured current arises from the electrochemical oxidation or reduction of the electrode surface. The type of reaction, oxidation or reduction, determines the sign of the sensor signal. A potentiostat and associated electronics are part of the sensor operation. A potentiostat is used with the three electrode sensor to provide a fixed potential for the working electrode relative to the reference electrode in the electrolyte. Apart from applying a voltage bias to the working electrode the potentiostat is used to convert the sensor's current signal to a voltage for measurement.

Differences in Electrochemical Material Selection vs. Conductimetric Material Selection

Referring now to the Figure depicted at Page 8 of the Examiner's Answer (*i.e.*, Barisci, Figure 2), there is shown a potentiometric measuring technique in Figure 2(a). In potentiometric measurements performed on systems such as that depicted in Figure 2(a), there is no current through the system. In potentiometric sensors, the analytical information is obtained by converting the recognition process into a potential signal, which is proportional (in a logarithmic fashion) to the concentration of ionic species generated or consumed. Such devices rely on the use of ion selective electrodes for obtaining the potential signal.

Figure 2(b) depicts a 3 electrode system. In a 3 electrode system an externally applied potential is required due to the potential drop across the cell due to ***the solution resistance*** (*i.e.*, potential drop (E) – current (i) x solution resistance (R)) and the polarization of the counter electrode that is required to complete the current measuring circuit. In a three electrode system the potential of the working electrode is controlled relative to the reference electrode, and a current passes between the working electrode and the auxillary/counter electrode (depicted as "i" in Figure 2(b) at page 8). Accordingly, there is no resistance measurement with respect to an analyte adsorbing to a polymer, rather the measurement is a current measurement (converted to voltage) produced by the ion changes in the electrolyte solution.

The Examiner alleges at page 15, bridging to page 16 of the Examiner's Answer, that it would be obvious to one of ordinary skill in the art at the time the invention was made to:

> ...incorporate the teachings of Casella, Thackeray, Yamato, Naarmann, Li, Sakaguchi, Stetter or Wampler relative to the incorporation of conductors such as carbon black, anions of tetrathiafulvalene derivatives, metal particles or metal oxide into the conductive organic polymers used in the sensing array of Gibson because of their sensitivity to known analytes gases or enhanced sensing and/or stability properties as taught by each of Casella, Thackeray, Yamato, Naarmann, Li, Sakaguchi or Wampler compared to sensors made with only the conductive polymers taught by Gibson and the recognized ability and expectation of the Gibson conductive polymers to be affected by interactions in a number of sensing formats in a manner that *change the electronic structure* and as a result the resistivity of the polymer as shown by Barisci.

(Emphasis added).

According to the Examiner, one would allegedly arrive at Appellants' claimed invention by taking the primary reference, combining it with the secondary references based upon motivation provided by a third reference, Barisci. Following the Examiner's reasoning, one of skill in the art would be taught, by Gibson, that polymer and polymer layers serve as sensing materials in conductimetric sensors. Turning then to the secondary references, one of skill in the art upon reading Casella, Thackeray, Yamato, Naarman, Li, Sakaguchi, Stetter or Wampler would conclude that the materials used in amperometric sensors of the cited references (*e.g.*, PANI-Pt materials) are inert, stable, conduct electrons and do not change resistance upon contact with an analyte, which is supported by the data collected and presented in those sensor systems. For example, at page 224, "Conclusions," Casella states, "The novelty of this study lies in the use of PANI films in alkaline media as an ***inert*** and stable organic matrix of copper-catalytic species." (Emphasis added). Turning finally to the reference that allegedly provides motivation, Barisci, one of skill in the art would conclude that polymer materials (*i.e.*, non-composite materials), serve as materials useful in conductimetric systems (cumulative to Gibson) and that such polymers have properties useful in redox reactions in electrochemical systems.

Appellants respectfully submit that the Examiner has not set forth a *prima facie* case of obviousness. More particularly, the Examiner has not provided the necessary motivation to combine the references as alleged in the Final Office Action. For example, a lack of motivation can be found when the alleged motivation to combine references requires that the teachings of the prior art references be modified such that the prior art technology does not function for its intended purpose. Such is the case in the obviousness rejection of record.

Appellants submit that in order to arrive at the Examiner's position with respect to the claims, one of skill in the art would have to disregard what is taught by

the references being relied upon by the Examiner and to imply a function in electrochemical (e.g., amperometric) systems that, in fact, would render the systems non-functional (*i.e.*, that the sensor materials of the secondary references "change electronic structure", see Examiner's Answer at page 16).

A determination of obviousness under 35 U.S.C. §103 requires an analysis of the claimed invention as a whole, and focusing on the obviousness of substitutions and differences, instead of on the invention as a whole, is a legally improper way to simplify that determination. *Gillette Co. v. S.C. Johnson & Son Inc.*, 16 USPQ2nd 1923, 1927 (Fed. Cir. 1990). Here, the Examiner alleges that it would be obvious to substitute materials in electrochemical sensor systems into a system that functions in a different manner. In performing this "substitution" the Examiner indicates that electrochemical sensors, and the material used therein, measure resistance (see, *e.g.*, page 7, lines 23-26 of the Examiner's Answer). However, by stating that electrochemical systems measure resistance, the Examiner has modified and changed the way electrochemical sensors operate (*i.e.*, rendering the materials used in the electrochemical sensor useless for their intended purpose). In other words, if the electrode materials in electrochemical systems increased in resistance, as alleged by the Examiner, the materials used in the electrodes would not be useful for their intended purpose. For example, if the polymer materials on an electrode in an electrochemical system increased in resistance over time due to imbibing, adsorbing, or absorbing an analyte or other contaminant, all current flow would cease in the system and the system would no longer function to measure the presence of an analyte (*i.e.*, the system would cease to function in the manner in which it was designed).

Changes from the prior art (*i.e.*, the electrochemical sensors), whether or not "minor", must be evaluated in terms of the whole invention, including whether the prior art provides any teaching or suggestion to one of ordinary skill in the art to make such changes to produce the claimed invention. *Northern Telecom Inc. v. Datapoint Corp.,* 15 USPQ 2nd 1321, 1324 (Fed. Cir. 1990). Here, the Examiner is substituting materials that serve different purposes and are selected for use in the particular systems based upon different properties, i.e., the materials of amperometric sensors are selected, in part, because they do not change conductivity upon contact with an analyte, whereas the materials in conductimetric sensors are selected because the do change conductivity when contacted with an analyte. In

other words, one of skill in the art would NOT want to use materials that increase in resistance in electrochemical systems because it would render the systems unfit for their intended purpose. Thus, if one of skill in the art were to develop sensors of the present invention (*i.e.*, sensors that change resistance when contacted with an analyte), the person of skill in the art would NOT look to electrochemical systems because the materials in electrochemical systems are specifically selected on the basis that they do NOT change resistance upon contact with an analyte. To modify the teachings of the secondary references to ignore this fundamental difference, as suggested by the Examiner, is to modify the art in such a manner that renders electrochemical sensors inoperable.

Appellants submit that the Examiner has focused substituting one material for another without examination of the differences in the art with respect to the use of the material and the properties necessary for such use in electrochemical sensor systems. Such modifications and combination render the prior art references being relied upon unfit for their intended purpose thus demonstrating the lack of motivation relied upon by the Examiner.

A basis for the Examiner's motivation to combine the references can be found in the apparent misunderstanding in the operation of electrochemical sensors as set forth in the Examiner's at page 7, lines 23-26,

> In 2(b) [of Barisci] the working electrode is separated from the other two electrodes by the polymer layer so that in all instances the potential, current or *resistance being measured is measured through the conducting polymer layer.*

(Emphasis added). Appellants respectfully submit that one of skill in the art will recognize that the working electrode is in direct electrical communication with the reference and counter electrode and are not "separated from the other two electrodes by the polymer layer". Furthermore, the polymer layer does not serve as a barrier such that "potential, current or resistance [is] measured through the conducting polymer." Rather the conducting polymer serves to facilitate electron transfer from an ionic species in the electrolyte solution to the electrode. Because of the polymer layer's role in electrochemical systems, it is important that the polymer layer not change its ability to conduct electrons (*i.e.*, does not change its ability to facilitate electron transport). Appellants can provide references (in addition to, *e.g.*, Casella) explaining that the working electrode should be electrochemically inert (*i.e.*,

that ideally the electrochemical sensor does not imbibe the analyte to be measured thus becoming "poisoned"). Appellants have not provided such basic references as the knowledge is common in the art. The fact that a working electrode should be "invisible" or inert is common knowledge in the art. It is also common knowledge that if a material adsorbs to the surface of a working electrode (*e.g.*, a polymer layer), that the electron transfer process will degrade and the amperometric system will cease to function, thus defeating its use as a sensor in electrochemical systems. Where an electrode in such systems becomes "poisoned" by the analyte, the electrode (*e.g.*, polymer layer) must be cleaned in order to maintain the sensor's functionality. Sensor materials that are easily poisoned are not suitable for use in electrochemical sensors.

The Examiner alleges that Appellants do not cite any support for the position that the materials used in electrochemical systems should be "invisible". Appellants respectfully direct the Examiner and the Board to, for example, Casella at page 224, "Conclusions," wherein Casella states,

> The novelty of this study lies in the use of PANI films in alkaline media as an ***inert*** and stable organic matrix of copper-catalytic species.

(Emphasis added). Appellants previously used the term "invisible" to refer to the inert nature of the material (i.e., that it does not change in a manner that is sensed by the system). If an electrode is not inert it becomes "poisoned". Poisoning is the process which takes place when interference gases or analytes bind to the active material in the sensors' electrodes, thus reducing their efficiency.

Appellants respectfully submit that in electrochemical (e.g., amperometric) systems "resistance" is not measured; an increase in the resistance of a polymer is detrimental to the system's function and a change in the polymer layer due to absorbing an analyte is very undesirable. In fact, if the electrode materials of amperometric and potentiometric systems increased in resistance, the sensing system would fail to function. What is measured in amperometric systems is the flow of electrons, measured as voltage.

Electrochemical (e.g., amperometric/potentiometric) sensors are based on the detection of electroactive species involved in the chemical or biological recognition process through electron transfer (*i.e.*, conversion of a chemical ionic charge to an electric charge). The signal transduction process is accomplished by controlling the

potential of the working electrode at a fixed value (relative to a reference electrode) and monitoring the current as a function of time. The applied potential serves as the driving force for the electron transfer reaction of the electroactive species. The resulting current is a direct measure of the rate of the electron transfer reaction. Barisci describes this well at page 308, second column, lines 29-31,

> Amperometric detection is based on the fact that the analyte will modify the ***current <u>produced</u>*** by the oxidation/reduction of the polymer (Fig. 3).

(Emphasis added). Accordingly, a change in resistance of the working electrode in an electrochemical system (*i.e.*, an increase in resistance) would result in an amperometric system that would cease to function properly as there could be no conversion of ion species to electron species (*i.e.*, no redox reactions would occur and no current would be produced). Thus, in electrochemical systems the movement of electrons is critical to the system's function, a change in electron movement in the polymer due to, for example, poisoning by an analyte thereby increasing the resistance in the polymer would cause the amperometric system to not function for its intended purpose.

The use of amperometric sensors to detect analytes by measuring resistance would be to use the amperometric system in a way that defeats its function/purpose. Thus, the alleged teaching relied upon by the Examiner (*i.e.*, that amperometric systems measure resistance) defeats the fundamental principle of operation of an amperometric system. As the courts have indicated, the proposed modification of a reference to provide a case of obviousness cannot render the prior art unsatisfactory for its intended purpose. <u>If the proposed modification would render the prior art unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification</u>. *In re Gordon,* 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984); MPEP §2143.01 (Emphasis ours). In other words, the proposed modification cannot change the principle of operation of a reference. If the proposed modification or combination of the prior art would change the principle of operation of the prior art being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious. *In re Ratti,* 270 F.2d 810, 123 USPQ 349 (CCPA 1959); MPEP §2143.01.

In making the obviousness rejection of record, the Examiner is asking that the teaching of the references be modified in such away as to render the amperometric

systems and the material used therein non-functional. The systems depicted in Figure 2 of Barisci (and at page 8 of the Examiner's Answer) would not function properly if the polymer present on those electrodes changed resistance by absorbing an analyte.

In contrast to the potentiometric and amperometric systems, conductimetric sensors are designed to adsorb, absorb, and imbibe analytes. In other words in conductimetric sensors it is desirable to have a sensing material (*e.g.*, a polymer material) that reacts with the analyte by adsorbing the analyte on to the sensor material resulting in a change in resistance. This is in direct opposite to the types of materials that are selected to serve in potentiometric and amperometric sensor systems.

Sensitivity to Analytes

Contrary to the Examiner's statements in the Examiner's Answer, Appellants submit that Casella, Thackeray *et al.*, Yamato *et al.*, Naarmann, Li, Sakaguchi and Wampler do not teach materials that are sensitive to known analyte gases, but rather teach materials that promote catalysis in REDOX reactions and thus serve as amperometric-electrochemical sensors. In amperometric-electrochemical sensors an electrochemical conversion occurs at the polymer interface. In electrochemical sensors ionic species transfer their electrons to or from the polymer material to cause electron flow and that the "gas analyte" is not required to come into direct contact with the sensing material.

The Examiner's alleges Appellants' argument regarding the secondary references not teaching materials that are sensitive to known analyte gases are irrelevant to the pending claims (see, *e.g.*, Examiner's Answer at page 20, bottom, to page 21, top). However, Appellants did not provide the argument to address the claims, but to address the alleged motivation set forth by the Examiner as stated at page 15, bridging to page 16 of the Examiner's Answer:

> ...incorporate the teachings of Casella, Thackeray, Yamato, Naarmann, Li, Sakaguchi, Stetter or Wampler relative to the incorporation of conductors such as carbon black, anions of tetrathiafulvalene derivatives, metal particles or metal oxide into the conductive organic polymers used in the sensing array of Gibson ***because of their sensitivity to known analytes gases or enhanced sensing and/or stability properties as taught by each of Casella, Thackeray, Yamato, Naarmann, Li, Sakaguchi or Wampler*** compared to sensors made with only the conductive polymers taught by Gibson and the recognized ability and expectation of the Gibson conductive polymers to be affected by interactions in a number of

> sensing formats in a manner that change the electronic structure and as a result the resistivity of the polymer as shown by Barisci.

(Emphasis added). Appellants submit that none of the cited references teach a polymer that is sensitive to known analytes but rather that the polymers are useful in detecting an analyte through redox reactions. In other words, the polymer is not sensitive to the analyte, rather the polymer is sensitive to ions produced in the amperometric system of the references. Such ions can be from any number of ionic species and thus the sensors are non-specific. Thus, one of skill in the art would not be motivated to utilize the polymers of Casella, Thackeray, Yamato, Naarmann, Li, Sakaguchi or Wampler because they are ***not*** sensitive to known analytes as alleged by the Examiner, but are rather sensitive to ions (*i.e.*, any charged atom).

Composite Materials

At page 11, lines 6-9 of the Examiner's Answer, the Examiner states,

> In the first paragraph of page 311 [of Barisci], a discussion of composite materials in which the conducting polymer is combined with another material. These composite materials showed improved reproducibility when used as sensors, adequately compensating for any problems due to an expected lower sensitivity.

Appellants submit that the paragraph referred to at page 311 of Barisci does not describe inorganic materials (as recited in Appellants' claims) and furthermore teaches that the composite "is not a true composite, but a graft copolymer." (See, *e.g.*, Barisci at page 311, lines 8-12).

The Examiner's Answer further misconstrues Stetter. At page 14, beginning at line 22 of the Examiner's Answer, the Examiner indicates, "The sensor comprises a polymer whose physical structure is altered by the vapor. . ." The Examiner then goes on to allege that the sensor comprises conductive particles such as copper, silver gold, platinum and the like (see, *e.g.*, the Examiner's Answer at page 15, lines 1-4). Appellants respectfully submit that Stetter teaches the use of a chemiresistive layer comprising a mixture of conductive particles and an ***insulator*** (*e.g.*, an elastomer/polymer, see, column 3, lines 5-9 of Stetter). Various polymers are identified at column 4, lines 49-55, and consist of ethylene propylene, styrene butadiene, silicone, fluorsilicone, butyl rubber, isobutylene isoprene, chloroprene, fluorocarbon and polyacrulate, all commonly used insulating polymers. Thus, Stetter does not teach a mixture of two compositionally different ***conductive*** materials, but to the contrary teaches and suggests only mixtures of conductive material and non-

conductive material. Appellants further show in the specification that the composite sensors of Appellants' invention have improved and unexpected sensitivity compared to composites of insulating polymer composites such as those in Stetter, thus demonstrating unexpected results (see, *e.g.*, the Appellants' specification at Figure 4 and page 15, lines 12-18).

Analyte Contact with Sensor Material

At page 20, lines 14-17, of the Examiner's Answer, the Examiner states,

> Thus Appellant's statement in the second full paragraph of page 5 of the Brief that the analyte does not come into direct contact with the sensor, is not consistent with the structure or description of these references.

Appellants respectfully submit that the molecular entity that comes in contact with the sensor material in the cited references (*i.e.*, Casella, Thackeray, Yamato, Naarman, Li, Sakaguchi, Stetter or Wampler) is an ion (*i.e.*, an electrically charged atom) and can in fact be any charged ion. For example, Yamato *et al.* teach an electrode for electrochemical measurements. Yamato *et al.* teach sensors having on their surface glucose oxidase (GOD) (see, Yamato *et al.* at page 235, first column, section 3.2). The purpose of the enzyme linked to the surface of the sensor is to oxidize glucose (see also, Barisci at page 309, 5th full paragraph).

The glucose oxidase catalyzes the conversion of glucose to gluconolactone (2*e* oxidation). The electrons are then shuttled to the polymer material on the electrode where the ion undergoes electron-transfer (*i.e.*, reduction) with the polymer to produce the amperometric current. As will be noticed, the analyte, glucose, does not cause a change in the polymer film in this electrochemical system. In other words, the oxidized ion is then used to cause a change in the potential across the system resulting in the production of current and thus an indirect detection of glucose. Glucose does not come into contact (*i.e.*, imbibe, adsorb, absorb) to the sensor material, rather the ion generated by the oxidation of glucose causes a measurable change in the production of current in the system.

Teaching Away

Furthermore, the Examiner is picking and choosing references in the art to satisfy the motivation to combine. For example, the Examiner states,

> Relative to the alleged teaching away by the Breheret and Mifsud references, examiner responds that Appellant has not limited the type of gases being

> sensed...It is also noted that these references are only applied relative to the claims that require additional structure....

(see Examiner's Answer at page 21, lines 20-26). Appellants submit that the teaching away in Breheret and Mifsud is also not specific to any particular gases or polymer sensors and are directed to the sensor class as a whole. The Examiner wishes to disregard this teaching and apply the references only to the dependent claims teaching additional structures. Although the references are applied to the claims with respect to additional structure, the teachings of the references encompass the state of the art as a whole. Thus, as a reference generally available to one of skill in the art, the teachings are available to Appellants to demonstrate a lack of motivation to utilize polymer sensors. Furthermore, Sestak (of record) teaches away from amperometric-electrochemical materials as they degrade due to oxidation.

Appellants are not attacking the references individually as alleged in the last paragraph at page 22 of the Examiner's Answer. The Appellants are merely describing the teachings of each reference individually in order to present the lack of motivation and missing elements when the references are combined. In addition, Appellants address specific references because they teach the "inert" characteristic of amperometric sensors and furthermore teach away from the use of polymer sensors. By addressing the list of references "generally" or from a high level, as suggested by the Examiner, the teachings of the references are being overlooked or misconstrued. Appellants are demonstrating that the generalizations made in the obviousness rejection are not accurate and thus the references should not be construed as providing certain information when in fact they do not provide such information and/or teach away from such information.

In order to justify the combination of references proposed by the Examiner one of skill in the art would be required to discard teachings in the art indicating that (1) polymer sensors are not sensitive to analytes (see, *e.g.*, Breheret and Mifsud I and II), (2) that polymer materials in amperometric-electrochemical sensors undergo degradation (see, *e.g.*, Sestak), and (3) that materials that are selected in amperometric sensors are useful because they do not change conductivity. Furthermore, in order to arrive at the alleged motivation to combine the references one would have to modify the materials and systems in the secondary references such that they no longer function for their intended purpose (*i.e.*, that the material in

the electrochemical sensors change in resistance). One of skill in the art would be required to discard the fundamental different operating conditions and principles of materials used in amperometric-electrochemical systems, namely that the materials be inert/invisible to the system (*i.e.*, they do not change their ability to conduct ions or electrons), to arrive at Appellants' invention which necessitates that the materials undergo a change in conductivity when contacted with an analyte.

For at least the foregoing reasons a prima facie case of obviousness has not been made.

Respectfully submitted,

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Appendix of Claims

See Appendix previously presented.